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RESEARCH ON THE BALSAM WOOLLY APHID IN OREGON AND WASHINGTON 1959 SEASON

By

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Work on chermes at the Pacific Northwest Forest and Range Experiment Station followed three principal courses in 1959 -- (1) Colonization of foreign insect predators of the aphid, (2) studies of native insect predators, and (3) studies of tree susceptibility and trends of damage. Progress and general findings of the work are discussed in the following sections:

Colonization of Foreign Predators

The predator introduction and colonization program that was started in 1957, and continued in 1958, was expanded considerably in 1959. Table 1 summarizes the predators released during the 3-year period, and shows that 14 species, totalling 38,445 specimens were colonized this year. The insects were provided through the generous cooperation of the Canada Department of Agriculture, which finances a world-wide project of parasite and predator collection. Foreign predators received in 1959 were collected in Czechoslovakia, Germany, Pakistan, India and Australia. One large colony of a European species, which is now established in Maine, was provided by the Northeastern Forest Experiment Station of the Forest Service. Releases this year were made in the Wind R., Toutle R., Green R., and Cowlitz R. drainages in Washington and in the Corvallis, Monroe, Monmouth, Black Rock, Willamette Pass, McKenzie Pass, and Santiam Pass areas in Oregon.

It is too early to evaluate success of the 1959 colonies, but it is known that at least four of the species introduced in 1957 and 1958 are established. Some of the established species, particularly the fly Aphidoletes thompsoni and the beetle Laricobius erichsonii, feed aggressively on bole infestations of chermes. It remains to be seen, however, whether they will: (1) reduce populations below tree-killing intensity, and (2) continue to thrive and spread throughout the chermes-infested area.

Studies of Native Predators

It has been found that at least 10 species of native predaceous insects feed on the balsam woolly aphid. Occasionally some of these are quite effective in temporarily lowering chermes populations. In general, however, their control effects are not particularly significant. The main reasons for this are: (1) The predators vary widely in abundance and are present in good numbers for only a month or two of the 8 to 10-month feeding period of chermes, and (2) the predators have a number of insect enemies of their own.

Studies of Tree Susceptibility

Subalpine fir appears to be the most susceptible of the native true firs to chermes attack, followed by Pacific silver fir and grand fir. No significant damage has been found on noble fir, and no infestation has been found on Shasta fir.

Among the three species that are being damaged significantly, there is considerable difference in the age when they first become susceptible to chermes and in how rapidly they are killed. Pacific silver fir shows very little susceptibility before it reaches about 50 years of age, and only minor damage has been found in stands less than 100 years old. Subalpine fir, however, is highly susceptible at all ages and is killed quickly. Grand fir is somewhat intermediate in the age at which significant attack begins, and it usually dies slowly despite heavy attack.

Table 1.-Foreign insect predators introduced since 1957 for
control of balsam woolly aphid in Oregon and Washington

Species and family	Source	Number released by years			Total	Release areas
		1957	1958	1959		
<u>Aphidoletes thompsoni</u> (Diptera: Itonididae)	Czechoslovakia and Germany	1,830	2,480	29,894	34,204	Ore.-Black Rock, Corvallis, Monroe, Willamette Pass, McKenzie Pass Wash.-Toutle R., Green R.
<u>Laricobius erichsonii</u> (Coleoptera: Derodontidae)	Czechoslovakia and Germany		8,525	1,600	10,125	Ore.-Black Rock, Corvallis, Willamette Pass, Monroe Wash.-Toutle R., Green R., Wind R.
<u>Neoleucopis obscura</u> (Diptera: Chamaemyiidae)	Maine (Europe)		700	2,085	2,785	Ore.-Willamette Pass Wash.-Green R.
<u>Aphidecta oblitterata</u> (Coleoptera: Coccinellidae)	Sweden, Germany		720	718	1,438	Ore.-Corvallis Wash.-Green R., Wind R.
<u>Cremifania nigrocellulata</u> (Diptera: Chamaemyiidae)	Czechoslovakia and Germany		385	989	1,374	Ore.-Willamette Pass, Corvallis, Monroe
<u>Chilocorus kuwanae</u> (Coleoptera: Coccinellidae)	Japan		135		135	Ore.-Monroe Wash.-Toutle R.
<u>Scymnus pumilio</u> (Coleoptera: Coccinellidae)	Australia			859	859	Wash.-Toutle R.
<u>Exochomus uropygialis</u> (Coleoptera: Coccinellidae)	Pakistan			1,641	1,641	Wash.-Green R.
<u>Exochomus lituratus</u> (Coleoptera: Coccinellidae)	Pakistan			316	316	Ore.-Corvallis
<u>Synharmonia conglobata</u> (Coleoptera: Coccinellidae)	India			121	121	Ore.-Santiam Pass Wash.-Randle
<u>Adalia tetraspilota</u> (Coleoptera: Coccinellidae)	India			89	89	Ore.-Santiam Pass, Portland, Monmouth
<u>Coccinella 4-punctata</u> (Coleoptera: Coccinellidae)	Pakistan			85	85	Ore.-Black Rock
<u>Leis dimidiata</u> (Coleoptera: Coccinellidae)	India			23	23	Ore.-Willamette Pass, Monmouth
<u>Leucopis</u> sp. (Diptera: Chamaemyiidae)	Pakistan			15	15	Ore.-Monroe
<u>Harmonia breiti</u> (Coleoptera: Coccinellidae)	India			10	10	Ore.-Portland
Totals		1,830	12,945	38,445	53,220	